Need response before mid-sept.

GRIFFIN INTERNATIONAL INC

August 19, 1998

Mr. Matthew Moran
State of Vermont
Department of Environmental Conservation
Waste Management Division
Sites Management Section
103 South Main Street/ West Building
Waterbury, VT 05671-0404

RE: Initial Subsurface Investigation at Tallman's Store, Belvidere, VT;
VTDEC Site #93-1424

Dear Mr. Corse:

Enclosed please find Griffin's *Report on the Investigation of Subsurface Petroleum Contamination* at Tallman's Store in Belvidere.

Please call if you have any questions regarding the findings of the investigation or our recommendations.

Sincerely,

Kevin McGraw
Project Manager

cc: GI Project #39841203

Enc.

P.O. Box 943 • Williston, VT 05495 • Phone/Fax 802-865-4288
59 Clinton Street • Plattsburgh, NY 12901 • 518-562-4666 • Fax 518-561-6832

REPORT ON THE INVESTIGATION OF SUBSURFACE PETROLEUM CONTAMINATION at TALLMAN'S STORE ROUTE 109 BELVIDERE, VERMONT

JULY 21, 1998

Prepared for:

Jack F. Corse
Jack F. Corse, Inc.
P.O. Box 300
Cambridge, VT 05444

Prepared by:

GRIFFIN INTERNATIONAL

P.O. Box 943
Williston, Vermont 05495
(802) 865-4288

Griffin Project #: 39841203

I. INTRODUCTION

This report summarizes the investigation of subsurface petroleum contamination at Tallman's Store located on Route 109 in Belvidere, Vermont (see Site Location Map and Area Map, Appendix A). The following investigation has been conducted to define more clearly the degree and extent of petroleum contamination which was detected in the soils at this site during the removal of two gasoline underground storage tanks (USTs) on June 21, 1993. Included in the report are the findings from the drilling along with the results of subsequent groundwater sampling conducted at the property. This work has been completed for Mr. Jack Corse by Griffin International, Inc. (Griffin) in accordance with the *Work Plan and Cost Estimate for Additional Work at Tallman's Store*, dated March 23, 1998.

II. HISTORICAL BACKGROUND

On June 21, 1993, two gasoline USTs were removed from the subsurface at Tallman's Store. One of the tanks was a 1,000-gallon tank and the other was a 500-gallon tank. Upon removal, both tanks appeared to be in good condition. Soil contamination was evident around both tanks and appeared to be from product piping and also from spillage around the USTs. The limits of contamination could not be determined during the tank closure due to the proximity of Route 109 on the south sides of the tanks. All soils from the excavation were backfilled to avoid collapse of the roadway.

In response to the soil contamination detected during the removal of the USTs, the Vermont Department of Environmental Conservation (VTDEC) requested additional work in order to determine the severity of contamination present at the site. The following report presents the findings from Griffin's Site Investigation conducted in April and May, 1998.

III. SITE DESCRIPTION

Tallman's Store is located on the north side of Route 109 in the Cold Hollow Mountains of north-central Vermont. The North Branch of the Lamoille River is located just south of Route 109 and approximately 65 feet south of the former tank locations. Local terrain in the vicinity of the store and Route 109 is relatively level, however, on either side of the river, the land slopes up hillsides to the north and south of the river (see Site Location Map). Based on the proximity of the river, groundwater flow beneath the site was estimated to be to the southwest. The elevation of the site is approximately 258 meters above mean sea level.

The area surrounding the site consists of a mix of commercial and residential uses primarily. The area is served by private water supplies. Tallman's Store and several of the neighboring residences obtain their water from springs located several hundred feet

north of the site. The springs are located substantially upgradient from the site on the slopes of the Cold Hollow Mountains. The residence across the street from the store obtains water from a drilled well (SW1). SW1 is located approximately 75 feet southwest of the former USTs at Tallman's Store. According to state records, it appears that this well is a drilled bedrock well and is 222 feet deep. This well reportedly has 56 feet of casing, has a yield of 1.5 gallons per minute, and was observed to be artesian. Three other residences located west of the store also obtain their water from private drilled wells (see Area Map in Appendix A).

→ info on other supply wells?

The Surficial Geologic Map of Vermont maps the surrounding area as glaciofluvial kame gravel. Actual subsurface materials consist of fine sand, silt, and gravel in varying proportions.

depth to bedrock?

IV. SUBSURFACE INVESTIGATION

On April 29, 1998, four monitoring wells were installed by Adams Engineering using a truck-mounted vibratory drill rig. The monitoring wells, designated MW-1 through MW-4, were installed to help define the degree and extent of petroleum contamination in the vicinity of the former gasoline USTs. MW-1 was installed near the east end of the former gasoline tank pit. The boring for MW-2 was drilled on the west side of the former tank pit. MW-3 and MW-4 were installed in the estimated downgradient directions from the former tank pit area. The locations of the wells are shown on the Site Map in Appendix A.

Continuous core samples were obtained in each boring. Soil samples were screened for VOCs using a Photovac Model No. 2020 photoionization device. In addition, soil characteristics were recorded in detailed boring logs by the supervising Griffin hydrogeologist.

In the boring for MW-1, fine sand and silt were predominant from 3.5 to 9.5 feet below grade. Groundwater was encountered at approximately five feet below grade. Petroleum odors were observed in the soils from this boring. A maximum PID reading of 1,290 ppm was recorded for the soil sample collected at a depth of 3.5 to 4.5 feet below grade.

Soils retrieved from the boring for MW-2 were fine sand and silt from 1.5 to 6.5 feet below grade. From 6.5 to 8.5 feet below grade, fine and medium sand with some gravel was observed. Groundwater was again encountered at approximately five feet below grade. Petroleum odors were observed in all of the soil samples collected from this boring. A maximum PID reading of 1,550 ppm was recorded in soil collected from 1.5 to 4.5 feet below grade.

In the boring for MW-3, fine sand with some silt was observed from 3.2 to 6.8 feet below grade. Fine sand and gravel was encountered between 6.8 and 7.8 feet below grade. Groundwater was encountered at approximately 3.2 feet below grade. Petroleum odors

were observed in the soils from this boring. A maximum PID reading of 1,300 ppm was recorded for the soil sample collected at a depth of 4.5 to 5.8 feet below grade.

Soils retrieved from the boring for MW-4 consisted of fine sand and silt from grade to approximately 9.5 feet below grade. Fine sand and gravel was observed from 9.5 to 13 feet below grade. Groundwater was encountered at approximately 4.5 feet below grade. Petroleum odors were observed in the soils from this boring. A maximum PID reading of 1,510 ppm was recorded for the soil sample collected at a depth of 9.5 to 13 feet below grade.

The screens in monitoring wells MW-1, MW-2, MW-3, and MW-4 were set from 2.0' to 9.5', 3.5' to 8.5', 2.8' to 7.8', and 3.0' to 13.0', respectively. The monitoring wells were constructed with 1.5-inch diameter, Schedule 40 PVC riser and 0.010" slotted screen. A silica sand pack was placed around the screened portion of each well and a bentonite seal was placed in the annulus immediately above the sand pack. To complete the construction of each well, a road box was set in concrete at grade level. In addition, a locking well cap was placed on each monitoring well. The boring logs and well construction details for these wells are included in Appendix B.

V. WATER LEVELS AND WATER QUALITY

A. Water Table Elevations

Water table elevation measurements were collected from MW-1 through MW-4 on May 6, 1998. The water table was observed to be approximately 5 to 7 feet below grade at that time. The monitoring wells were surveyed in azimuth and elevation relative to the top-of-casing of MW-1 which has been assigned an arbitrary elevation of 100.00 feet. Liquid level monitoring data are presented in Appendix C.

Water table elevations have been plotted and contoured to illustrate the calculated gradient and direction of groundwater flow beneath the site (see Groundwater Contour Map, Appendix A). According to these data, groundwater is flowing to the southwest at a hydraulic gradient of 0.039.

B. Water Quality

Griffin collected groundwater samples at the site from all four monitoring wells. The groundwater samples were analyzed for petroleum compounds by EPA Method 602. The analytical results have been plotted to show the distribution of dissolved contamination across the site (see Contaminant Distribution Map, Appendix A).

Low to moderately high levels of benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in the four groundwater samples. MTBE, a gasoline additive, was not detected in any of the samples. The Vermont Groundwater Enforcement Standards

(VGES) for benzene, toluene, and ethylbenzene were exceeded in the samples from MW-1, MW-2, and MW-4. The VGES for benzene was also exceeded in the MW-3 sample. A groundwater quality summary for this sampling event is presented in Appendix D. The Endyne laboratory report is also included in this appendix.

The trip blank and duplicate sample analytical results indicate that proper quality assurance and quality control were maintained during the sampling and analysis.

Water samples were also collected from two supply wells in the area. The residence directly across Route 109 from Tallman's Store utilizes a drilled artesian well (see SW1 on Area Map). Several other residences located directly west of the store also utilize drilled supply wells. Only one of these three (identified as SW2 on Area Map) could be sampled on the day of sampling since two of the homeowners were not present at the time. Water samples were collected from SW1 and SW2 on May 6, 1998. Petroleum compounds were not detected in either sample.

→ need other wells sampled

VI. RIVERBANK SOIL SAMPLING

On April 29, 1998, the bank of the North Branch of the Lamoille River was screened for signs of petroleum contamination. Soil samples were placed into plastic baggies and screened for VOCs using a PID. Stained soils were observed on the soils of the riverbank located south of the southwest corner of the Marshall residence (across Route 109 from Tallman's Store). A PID reading of 102 ppm was recorded for soil sample S5. VOCs were detected in three other soil samples at less than 10 ppm. A Riverbank Soil Sampling Location Map, included in Appendix A, presents the findings from the soil screening.

Sample S5 was submitted to Endyne Inc. laboratory to be analyzed for petroleum compounds by EPA Method 8020 and Total Petroleum Hydrocarbons (TPH) by Modified EPA Method 8015. BTEX were detected in the riverbank soil sample at a total concentration of 211.1 parts per billion (ppb). TPH were measured to be 151 ppm.

VII. RECEPTOR RISK ASSESSMENT

A receptor risk assessment was conducted to identify known and potential receptors of the petroleum contamination detected at Tallman's Store. A visual survey was conducted at the time of monitoring well installation and during the UST closure inspection. A determination of the potential risk to identified receptors was conducted based on proximity, groundwater flow direction and gradient, and contaminant concentration levels.

Water Supplies

As outlined in Section III of this report, the area in the vicinity of Tallman's Store is served by private water supplies. Tallman's Store and several of the neighboring residences obtain their water from springs which appear to be located upgradient of the site. The residence across the street from the store obtains water from a drilled well located approximately 75 feet southwest of the former USTs at Tallman's Store. Three other residences located west of the store also obtain their water from private drilled wells.

Given its location relative to the dissolved contaminant plume, the Marshall supply well (SW1) is potentially at risk. The supply well sample results indicated that it was not contaminated at that time. In addition, this well was observed to be an artesian well with water overflowing at the ground surface.

The other three private wells identified to the west of Tallman's Store (including SW2) do not appear to be located directly downgradient of the contaminant plume and are likely at minimal risk of impact.

Buildings in the Vicinity

Tallman's Store has a basement for the potential accumulation of petroleum vapors. This basement is located approximately 15 to 20 feet north of the former tank area. On April 29, the basement was screened for VOCs using a PID. Elevated levels of VOCs were not detected along the south wall of the basement, closest to the former UST area, and as such, it does not appear that the basement is being impacted by the petroleum contamination from the former USTs. In addition, the estimated groundwater flow direction is to the southwest, away from the Tallman's Store, suggesting that vapor impact from the subsurface contamination is not likely.

The basement of the Marshall residence, located across Route 109 from Tallman's Store, was also screened for VOCs on April 29. No elevated levels of VOCs were detected in the basement on that day. However, this basement is located downgradient of the source area and appears to be at risk of petroleum impact since the contaminant plume has reached this area.

Surface Water

The North Branch of the Lamoille River is located approximately 65 feet south of the former UST locations on the Tallman's Store property . This river appears to have been impacted to some degree as evidenced by the riverbank sample which contained BTEX contamination and exhibited staining.

VIII. CONCLUSIONS

Based on the investigation at this site, Griffin has reached the following conclusions:

1. In each of the four soil borings, silt and fine sand were predominant. Adsorbed petroleum contamination was detected in all four soil borings advanced for this site investigation.

2. The water table elevation beneath the site, as measured using the interface probe, ranged from approximately 5 to 7 feet below grade. Based on the water table elevation data collected in May 1998, groundwater beneath the site is flowing to the southwest at a hydraulic gradient of 0.039.

3. Low to moderately high levels of dissolved BTEX contamination were detected in the groundwater samples collected from the four monitoring wells. The Vermont Groundwater Enforcement Standards for benzene, toluene, and ethylbenzene were exceeded in most of these samples. MTBE, a gasoline compound, was not detected in any of the samples at the site.

4. Soil samples collected from the bank of the North Branch of the Lamoille River were observed to be impacted with petroleum contamination. Stained soils were observed directly south of the southwest corner of the Marshall residence (S5). This soil sample had a PID reading of 102 ppm, and the laboratory sample submitted from this location confirmed the presence of BTEX and MTBE. These results suggest that petroleum contamination from Tallman's Store has reached the river.

5. Water samples were collected from the two private drinking water supplies closest to the site. Dissolved petroleum contamination was not detected in either sample. The Marshall residence well is installed through the dissolved contaminant plume. This well is reported to be a true artesian well and, as such, may be at less risk of impact due to the upward hydraulic gradient of the bedrock aquifer.

6. The risk assessment for this site has determined that there is a risk to the Marshall residence supply well and basement. In addition, the North Branch of the Lamoille River has been impacted.

IX. RECOMMENDATIONS

Based on the above conclusions, Griffin recommends that a semi-annual groundwater monitoring schedule be initiated. During these site visits, liquid level measurements should be collected from all four groundwater monitoring wells prior to sampling. Groundwater samples should be analyzed by EPA Method 602. In addition, the basement of the Marshall residence should be screened for VOCs again during the next site visit and their water supply should be resampled during each semi-annual site visit. The first semi-annual site visit should be conducted in October of 1998.

Comments

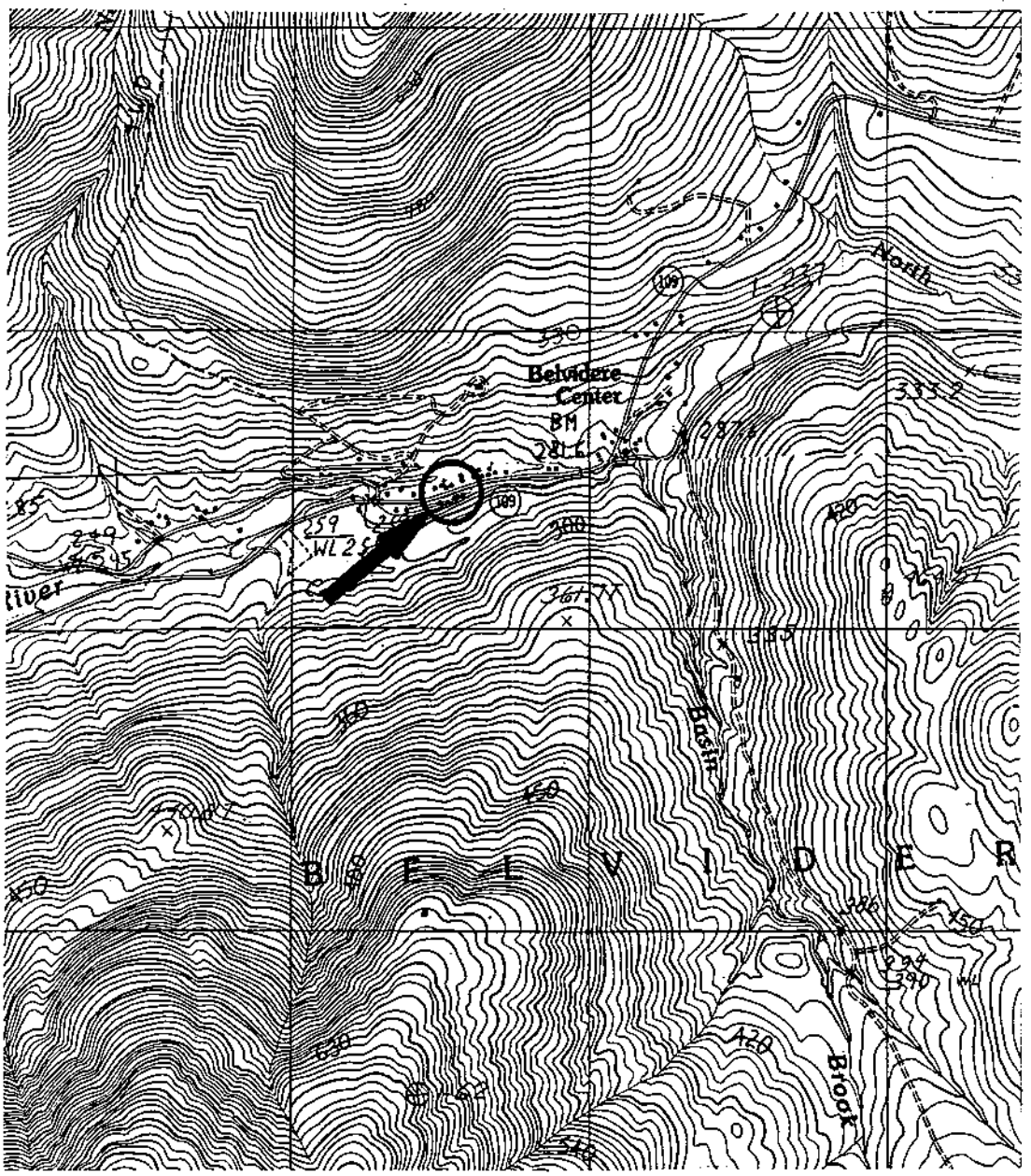
- Sample all wells by 8021b + SW-1
- Screen Marshall basement
- Also, info on other 3 wells; if either of other 2 are overburden, then sample
- Depth to bedrock from SW logs.

APPENDICES

APPENDIX A

Maps

Site Location Map
Area Map
Site Map
Groundwater Contour Map
Contaminant Distribution Map
River Bank Soil Sampling Location Map



JOB #: 39841203
SOURCE: USGS- JOHNSON, VERMONT AND COLD HOLLOW MOUNTAINS QUADRANGLES.

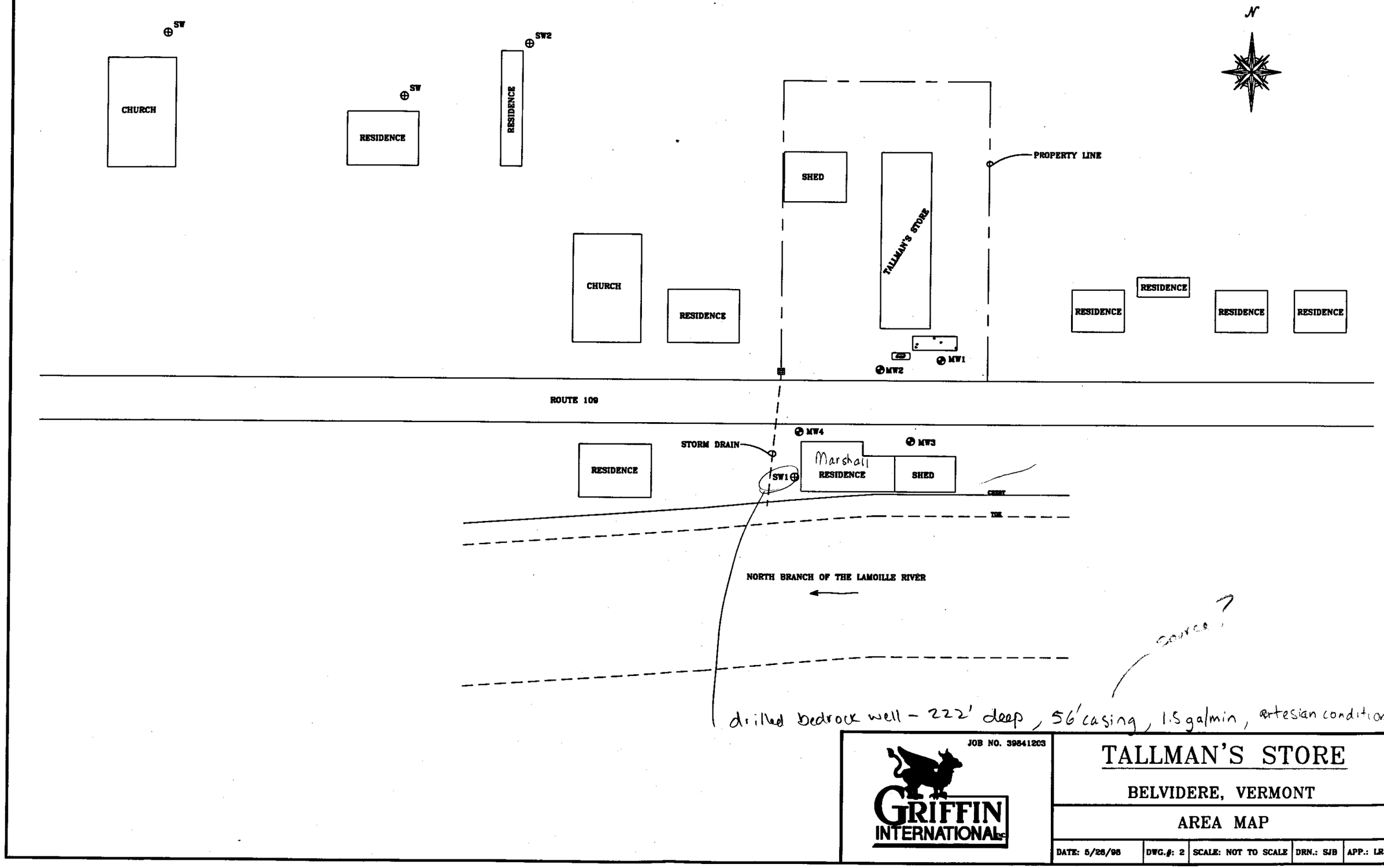
GRIFFIN INTERNATIONAL INC

TALLMAN'S STORE

BELVIDERE, VERMONT

SITE LOCATION MAP

DATE: 5/19/98	DWG.#:1	SCALE: 1:24000	DRN.:SB	APP.:LR



JOB NO. 39841203

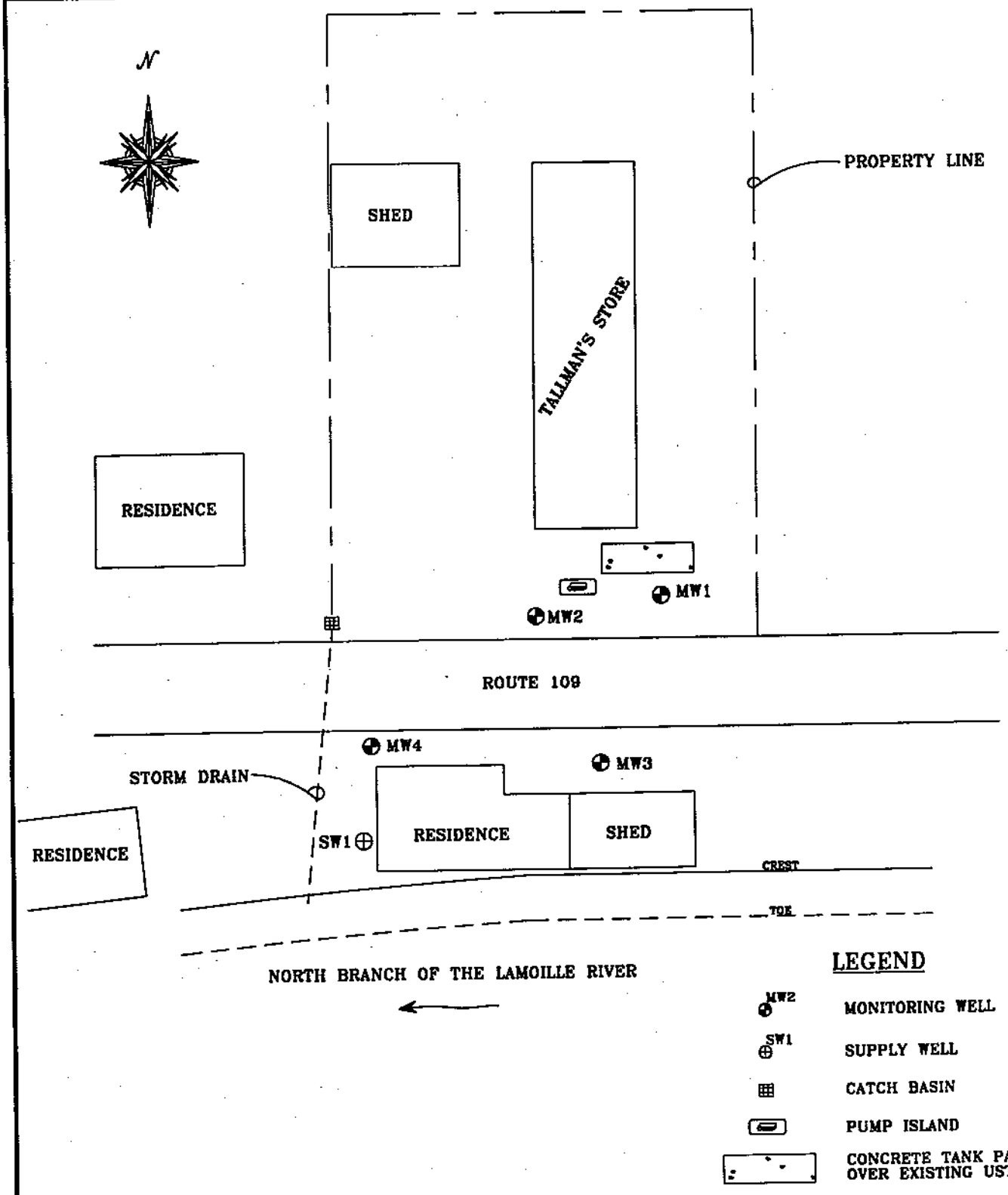
GRIFFIN INTERNATIONAL, Inc.

TALLMAN'S STORE

BELVIDERE, VERMONT

AREA MAP

DATE: 5/26/98	DWG.#: 2	SCALE: NOT TO SCALE	DRN.: SJB	APP.: LR



JOB #: 39841203

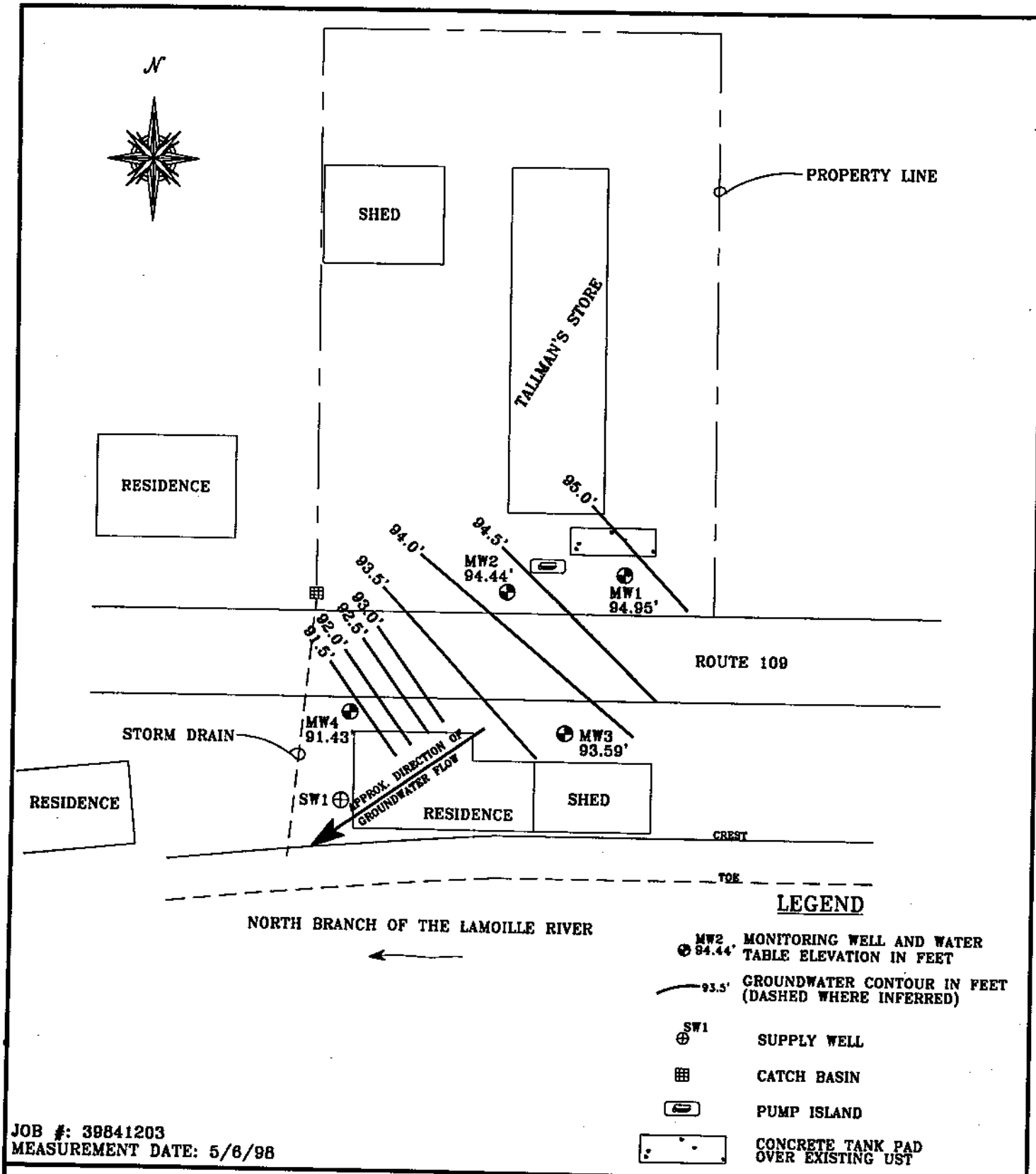
GRIFFIN INTERNATIONAL INC

TALLMAN'S STORE

BELVIDERE, VERMONT

SITE MAP

DATE: 5/29/98	DWG.#:3	SCALE: 1"=40'	DRN.:SB	APP.:LR



JOB #: 39841203
MEASUREMENT DATE: 5/6/98

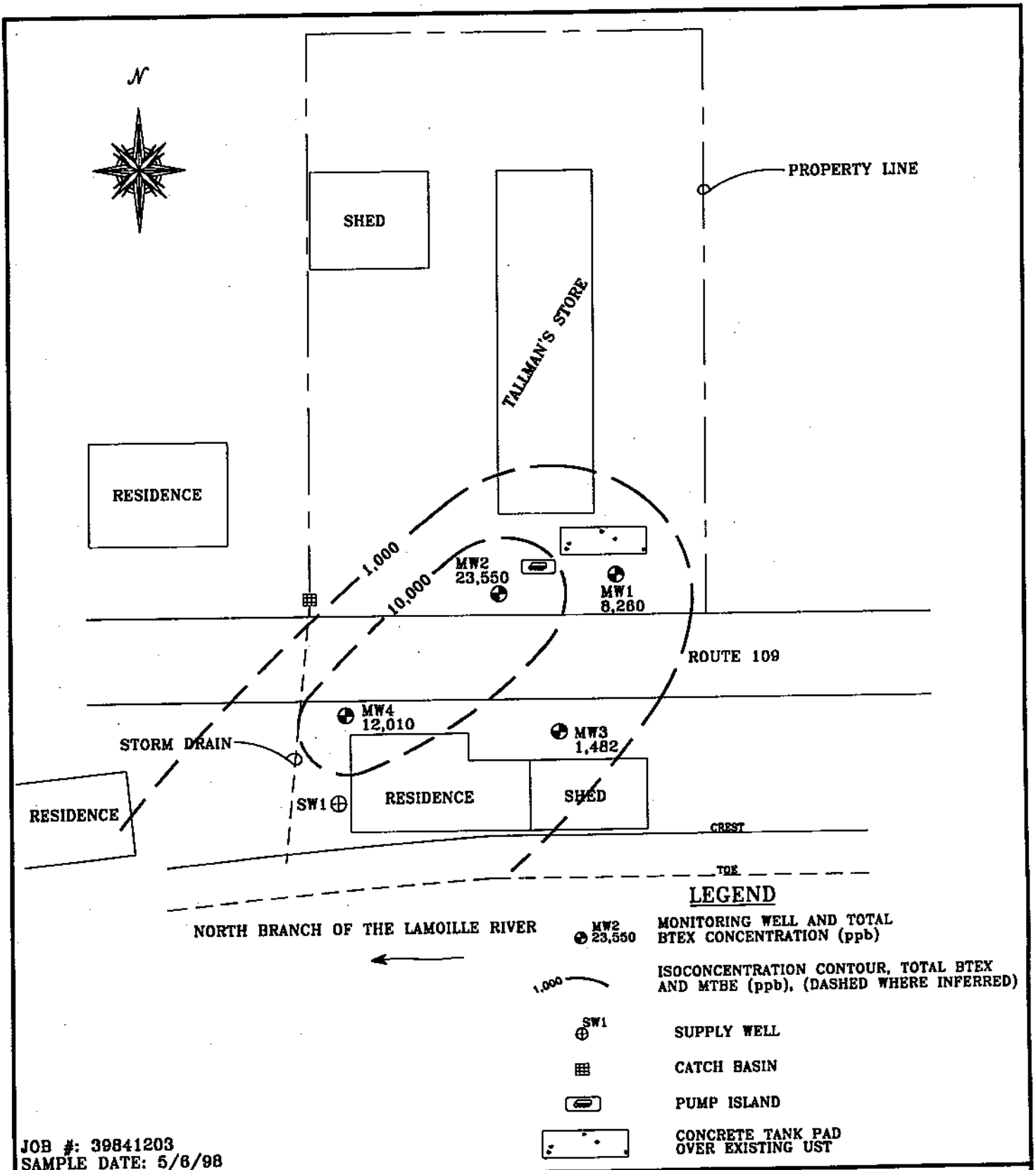
GRIFFIN INTERNATIONAL INC.

TALLMAN'S STORE

BELVIDERE, VERMONT

GROUNDWATER CONTOUR MAP

DATE: 5/29/98	DWG.#:4	SCALE: 1"=40'	DRN.:SB	APP.:LR



JOB #: 39841203
SAMPLE DATE: 5/6/98

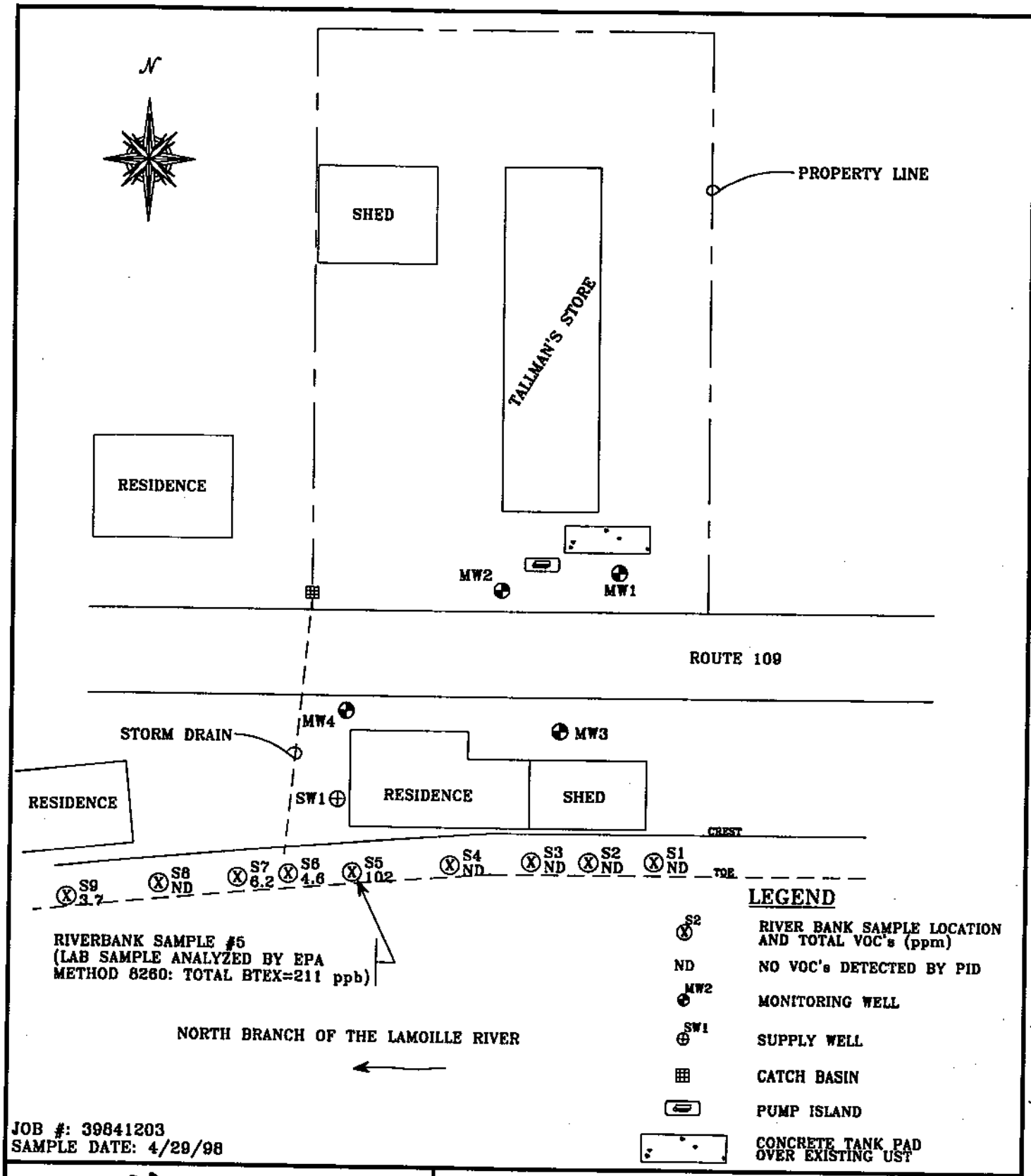
GRIFFIN INTERNATIONAL INC

TALLMAN'S STORE

BELVIDERE, VERMONT

CONTAMINANT DISTRIBUTION MAP

DATE: 5/29/98	DWG.#:5	SCALE: 1"=40'	DRN.:SB	APP.:LR



JOB #: 39841203
SAMPLE DATE: 4/29/98

GRIFFIN INTERNATIONAL INC.

TALLMAN'S STORE

BELVIDERE, VERMONT

RIVERBANK SOIL SAMPLING LOCATION MAP

DATE: 5/29/98	DWG.#:6	SCALE: 1"=40'	DRN.:SB	APP.:LR

APPENDIX B

Well Logs

PROJECT TALLMAN'S STORE

LOCATION BELVIDERE, VERMONT

DATE DRILLED 4/29/98 TOTAL DEPTH OF HOLE 9.5'

DIAMETER 2.75"

SCREEN DIA. 1.5" LENGTH 7.5' SLOT SIZE 0.010"

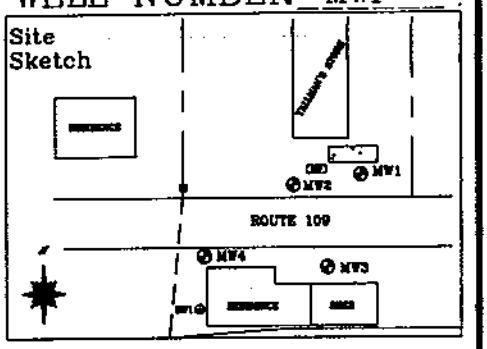
CASING DIA. 1.5" LENGTH 1.7' TYPE sch 40 pvc

DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY

DRILLER GERRY ADAMS LOG BY L. REED

WELL NUMBER MW1

Site Sketch



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
		LOCKING WELL CAP			
		CONCRETE			
1		BENTONITE	0'–3.5' 1.0 ppm	Medium brown, fine SAND and coarse GRAVEL, (fill), dry.	1
2		WELL RISER			2
3					3
4		SAND PACK	3.5'–4.5' 1,290 ppm	Black stained, fine SAND and SILT, with few medium sand, trace coarse sand, damp, petroleum odor.	4
5				5.0' WATER TABLE	5
6		WELL SCREEN			6
7			4.5'–9.5' 700 ppm	Brown, fine SAND, some silt, trace medium sand with 0.2' interbed of black stained medium sand, wet.	7
8					8
9		BOTTOM CAP			9
10		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 9.5' END OF EXPLORATION AT 9.5'	10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT TALLMAN'S STORE

LOCATION BELVIDERE, VERMONT

DATE DRILLED 4/29/98 TOTAL DEPTH OF HOLE 8.5'

DIAMETER 2.75"

SCREEN DIA. 1.5" LENGTH 5.0' SLOT SIZE 0.010"

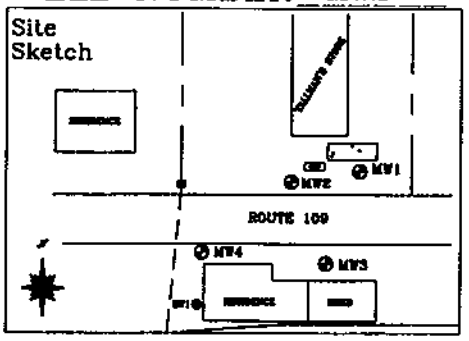
CASING DIA. 1.5" LENGTH 3.0' TYPE sch 40 pvc

DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY

DRILLER GERRY ADAMS LOG BY L. REED

WELL NUMBER MW2

Site Sketch



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX LOCKING WELL CAP CONCRETE			0
1		BENTONITE	0'–1.5' 1,400 ppm	Brown, fine SAND, small gravel, dry. GRAVEL, (fill), dry.	1
2					2
3		WELL RISER		Brown, fine SAND and SILT with trace medium sand, small sub-rounded gravel, moist, petroleum odor.	3
4		SAND PACK	1.5'–4.5' 1,550 ppm		4
5				5.0' WATER TABLE	5
6		WELL SCREEN	4.5'–6.5' 1,360 ppm	Brown, fine SAND and SILT with trace medium sand, small sub-rounded gravel, moist, petroleum odor.	6
7					7
8		BOTTOM CAP	6.5'–8.5' 700 ppm	Brown, fine and medium SAND, some small sub-rounded gravel, trace silt, large gravel, wet, petroleum odor.	8
9		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 8.5' END OF EXPLORATION AT 8.5'	9
10					10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

WELL NUMBER MW3

PROJECT TALLMAN'S STORE

LOCATION BELVIDERE, VERMONT

DATE DRILLED 4/29/98 TOTAL DEPTH OF HOLE 7.8'

DIAMETER 2.75"

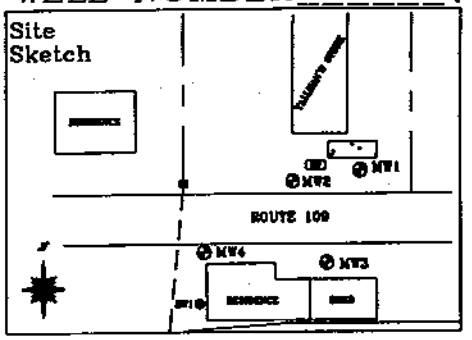
SCREEN DIA. 1.5" LENGTH 5.0' SLOT SIZE 0.010"

CASING DIA. 1.5" LENGTH 2.4' TYPE sch 40 pvc

DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY

DRILLER GERRY ADAMS LOG BY L. REED

Site Sketch



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX LOCKING WELL CAP CONCRETE			0
1		BENTONITE	0'–3.2' 1.1 ppm	Brown, fine SAND, small sub-angular GRAVEL, dry.	1
2		WELL RISER			2
3		SAND PACK		3.2' WATER TABLE	3
4			3.2'–4.5' 48 ppm	Brown, fine & medium SAND, some silt, wet, slight petroleum odor.	4
5		WELL SCREEN	4.5'–5.8' 1,300 ppm	Brown, fine SAND and SILT, wet, petroleum odor.	5
6			5.8'–6.8' 1,180 ppm	Black stained, fine SAND, petroleum odor.	6
7		BOTTOM CAP	6.8'–7.8' 1,204 ppm	Brown, medium SAND, fine sub-angular gravel, wet.	7
8		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 7.8' END OF EXPLORATION AT 7.8'	8
9					9
10					10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT TALLMAN'S STORE

LOCATION BELVIDERE, VERMONT

DATE DRILLED 4/29/98 TOTAL DEPTH OF HOLE 13.0'

DIAMETER 2.75"

SCREEN DIA. 1.5" LENGTH 10.0' SLOT SIZE 0.010"

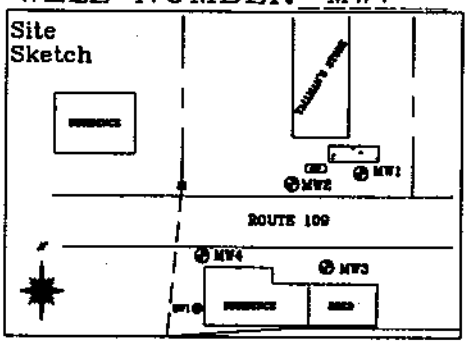
CASING DIA. 1.5" LENGTH 2.6' TYPE sch 40 pvc

DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY

DRILLER GERRY ADAMS LOG BY L. REED

WELL NUMBER MW4

Site Sketch



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX LOCKING WELL CAP CONCRETE			0
1					1
2		BENTONITE	0'–4.5' nd	Brown, fine and medium SAND, trace silt, coarse sand, small sub–rounded gravel.	2
3					3
4		WELL RISER			4
5				4.5' WATER TABLE	5
6		SAND PACK	4.5'–8' 16.9 ppm	Brown, fine SAND and SILT, medium sand, small gravel, wet.	6
7					7
8					8
9		WELL SCREEN	8'–9.5' 1,310 ppm	Brown, fine SAND, trace silt, wet, black staining and petroleum odor.	9
10			9.5'–10' 1,450 ppm	Black stained, fine SAND with some fine subrounded gravel, wet, strong petroleum odor.	10
11					11
12		BOTTOM CAP	9.5'–13' 1,510 ppm	Black stained, fine and medium SAND, some small sub–rounded gravel, trace large gravel, trace silt, wet.	12
13		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 13.0' END OF EXPLORATION AT 13.0'	13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

APPENDIX C

Liquid Level Monitoring Data

Liquid Level Monitoring Data
Tallman's Store, Belvidere, VT

5/6/98

Well I.D.	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	100.00		5.05					94.95
MW-2	99.06		4.62					94.44
MW-3	98.85		5.26					93.59
MW-4	98.25		6.82					91.43

All Values Reported in Feet

Top-of-Casing Elevations Measured in Feet Relative to MW-1 set at 100.00'

APPENDIX D

Groundwater Quality Summary

Laboratory Reports

Groundwater Quality Summary
Tallman's Store
Belvidere, Vermont

May 6, 1998

PARAMETER	Sample Point								VGES
	MW-1	MW-2	MW-3	MW-4	Duplicate of MW-2	Trip Blank	SW1	SW2	
Benzene	600.	2,460.	139.	2,290.	2,430.	ND	ND	ND	5.
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	100.
1,2-DCB	ND	ND	ND	ND	ND	ND	ND	ND	600.
1,3-DCB	ND	ND	ND	ND	ND	ND	ND	ND	600.
1,4-DCB	ND	ND	ND	ND	ND	ND	ND	ND	75.
Ethylbenzene	1,100.	1,420.	389.	1,620.	1,340.	ND	ND	ND	700.
Toluene	2,720.	9,850.	386.	3,340.	9,680.	ND	ND	ND	1,000.
Xylenes	3,840.	9,820.	568.	4,760.	9,310.	ND	ND	ND	10,000.
Total BTEX	**8,260.**	**23,550.**	**1,482.**	**12,010.**	**22,760.**	**ND**	**ND**	**ND**	-
MTBE	ND	ND	ND	ND	ND	ND	ND	ND	40.
BTEX+MTBE	**8,260.**	**23,550.**	**1,482.**	**12,010.**	**22,760.**	**ND**	**ND**	**ND**	-

All Values Reported in ug/L (ppb)
VGES - Vermont Groundwater Enforcement Standard
ND - None Detected
TBQ - Trace Below Quantitation Limit

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Tallmans Store
REPORT DATE: May 11, 1998
DATE SAMPLED: May 6, 1998

PROJECT CODE: GITS1544
REF.#: 120,219 - 120,226

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Tallmans Store
CLIENT PROJ. #: 39841203

DATE RECEIVED: May 7, 1998
REPORT DATE: May 11, 1998
PROJECT CODE: GITS1544

Ref. #:	120,219	120,220	120,221	120,222	120,223
Site:	MW 1	MW 2	MW 2 Duplicate	MW 3	MW 4
Date Sampled:	5/6/98	5/6/98	5/6/98	5/6/98	5/6/98
Time Sampled:	9:46	10:03	10:03	9:39	10:10
Sampler:	W. Doe	W. Doe	W. Doe	W. Doe	W. Doe
Date Analyzed:	5/8/98	5/8/98	5/8/98	5/7/98	5/7/98
UIP Count:	>10	>10\	>10	>10	>10
Dil. Factor (%):	2	1	1	2	1
Surr % Rec. (%):	94	96	92	81	80
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)
Benzene	600.	2,460.	2,430.	139.	2,290.
Chlorobenzene	<50	<100	<100	<50	<100
1,2-Dichlorobenzene	<50	<100	<100	<50	<100
1,3-Dichlorobenzene	<50	<100	<100	<50	<100
1,4-Dichlorobenzene	<50	<100	<100	<50	<100
Ethylbenzene	1,100.	1,420.	1,340.	389.	1,620.
Toluene	2,720.	9,850.	9,680.	386.	3,340.
Xylenes	3,840.	9,820.	9,310.	568.	4,760.
MTBE	<500	<1000	<1000	<500	<1000

Ref. #:	120,224	120,225	120,226		
Site:	SW1	SW2	Trip Blank		
Date Sampled:	5/6/98	5/6/98	5/6/98		
Time Sampled:	10:28	10:35	7:31		
Sampler:	W. Doe	W. Doe	W. Doe		
Date Analyzed:	5/7/98	5/8/98	5/7/98		
UIP Count:	0	0	0		
Dil. Factor (%):	100	100	100		
Surr % Rec. (%):	98	98	93		
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)		
Benzene	<1	<1	<1		
Chlorobenzene	<1	<1	<1		
1,2-Dichlorobenzene	<1	<1	<1		
1,3-Dichlorobenzene	<1	<1	<1		
1,4-Dichlorobenzene	<1	<1	<1		
Ethylbenzene	<1	<1	<1		
Toluene	<1	<1	<1		
Xylenes	<1	<1	<1		
MTBE	<10	<10	<10		

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

RUSH

26737

Project Name: 39841203 Site Location: TALLMANS STORE, BELVIDERE, VT	Reporting Address: GRIFFIN INT'L	Billing Address: GRIFFIN
Endyne Project Number: GITS1544	Company: GRIFFIN INT'L Contact Name/Phone #: 865 4288/LAURIE REED	Sampler Name: WILLIS DOE Phone #: 865 4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 5-6-98	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush 8 Hr
120,219	MW1	GW	✓		0946	2	VOA/40ml		602	HCl	↓
120,220	MW2	GW	↓		1003	↓	↓		↓	↓	↓
120,221	MW 2 DUPLICATE	GW	↓		~~0939~~ 1003	↓	↓		↓	↓	↓
120,222	MW3	GW	↓		~~1010~~ 0939	↓	↓		↓	↓	↓
120,223	MW4	GW	↓		1010	↓	↓		↓	↓	↓
120,224	SW1	TAP (DW)	↓		1028	↓	↓		↓	↓	↓
120,225	SW2	TAP (DW)	↓		1035	↓	↓		↓	↓	↓
120,226	TRIP BLANK	DISTILLED H2O	↓		0731	↓	↓		↓	↓	↓

RUSH

Relinquished by: Signature Willis Doe	Received by: Signature Tami Dodsley	Date/Time 5-6-98/1545
Relinquished by: Signature Tami Dodsley	Received by: Signature [signature]	Date/Time 5/7/98 11:00am

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

ENDYNE, INC.
32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

26737

Project Name: 39841203 Site Location: TRUMANS STORE, BELVIDERE, VT	Reporting Address: GRIFFIN INT'L	Billing Address: GRIFFIN
Endyne Project Number:	Company: GRIFFIN INT'L Contact Name/Phone #: 865 4288/LAURIE REED	Sampler Name: WILLIS DOE Phone #: 865 428 8B

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 5-6-98	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush 5/5 BD
	MW1	GW	✓		0946	2	40ml/vial		602	HCl	
	MW2	GW			1003						
	MW2 DUPLICATE	GW			0930 1003						
	MW3	GW			1010 0959						
	MW4	GW			1010						
	SW1	TAP (DW)			1026						
	SW2	TAP (DW)			1035						
	TRIP BLANK	DEIONIZED H2O			0721						

Relinquished by: Signature Willis Doe	Received by: Signature [illegible]	Date/Time 5-6-98/1545
Relinquished by: Signature [illegible]	Received by: Signature [illegible]	Date/Time 5/7/98 11:20

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Tallman's Store
DATE REPORTED: May 7, 1998
DATE SAMPLED: April 29, 1998

PROJECT CODE: GITS1452
REF. #: 119,914

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody did not indicate sample preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: Griffin International
PROJECT NAME: Tallman's Store
REPORT DATE: May 7, 1998
SAMPLER: L.T.R.
DATE SAMPLED: April 29, 1998
DATE RECEIVED: May 1, 1998

PROJECT CODE: GITS1452
ANALYSIS DATE: May 6, 1998
STATION: RS #5
REF.#: 119,914
TIME SAMPLED: 11:15

Parameter	Detection Limit (µg/kg)	Concentration As Received (µg/kg)
Benzene	5	45.9
Chlorobenzene	5	ND[1]
1,2-Dichlorobenzene	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
Ethylbenzene	5	26.1
Toluene	5	70.7
Xylene	10	68.4
MTBE	10	TBQ[2]

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane:	92.%
Toluene-d8:	94.%
4-Bromofluorobenzene:	100.%

PERCENT SOLIDS: 70.%

NOTES:

1 None detected
2 Trace below quantitation limit

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Tallman's Store
DATE REPORTED: May 7, 1998
DATE SAMPLED: April 29, 1998

PROJECT CODE: GITS1453
REF. #: 119,915

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody did not indicate sample preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy were monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8015

DATE: May 7, 1998
CLIENT: Griffin International
PROJECT: Tallman's Store
PROJECT CODE: GITS1453
COLLECTED BY: L.T.R.
DATE SAMPLED: April 29, 1998
DATE RECEIVED: May 1, 1998

Reference #	Sample ID	Concentration As Received (mg/kg)[1]
119,915	RS #5; 11:15	151.

Notes:

1 Value quantitated based on the response of Gasoline Standards. Method detection limit is 1.0 mg/kg.

ENDYNE, Inc.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

26063

Project Name: TAILMAN'S Store Site Location: Belvidere, VT	Reporting Address: GR&EW	Billing Address: GR&EW
Endyne Project Number: GITS 1453	Company: GR&EW Contact Name/Phone #: Laurie Reed	Sampler Name: LTR Phone #: 865-4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 4.29.98	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks Analyze	Analysis Required	Sample Preservation	Rush
119,915	RS #5	Soil	X		11:15	2	250 Amber	Please [redacted] TO 5ppb If Possible, (8020)	8020 TPH 8015		

Relinquished by: Signature [signature] Received by: Signature Tina Desroches Date/Time 5/1/98 10:00

Relinquished by: Signature Tina Desroches Received by: Signature Tonia M. Chambers Date/Time 5-1-98 10:00

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

GITS1453

119,914 – 119,915

CHAIN-OF-CUSTODY RECORD

26063

Project Name: TAILMAN'S Store Site Location: Belvidere, VT	Reporting Address: Griffin	Billing Address: Griffin
Endyne Project Number: GITS1452	Company: Griffin Contact Name/Phone #: Laurie Reed	Sampler Name: LTR Phone #: 865-4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 4:29.98	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks Analyze	Analysis Required	Sample Preservation	Rush
119,914	TRS #5	soil	X		11:15	2	250 Amber	Please [redacted]	8020 TPH 8015		
								TO 5ppB If	1		
								Possible. (8020)			

Relinquished by: Signature [signature] Received by: Signature [signature] Date/Time 5/1/98 10:00

Relinquished by: Signature [signature] Received by: Signature Tonia M. Chambers Date/Time 5-1-98 10:00

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	[illegible]	11	Total Solids	16	Metals (Specify)	21	EPA [illegible]	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

26063

Project Name: Tillman's Store Site Location: Bolvidere, VT	Reporting Address: Griffin	Billing Address: Griffin
Endyne Project Number:	Company: Griffin Contact Name/Phone #: Laurie Reed	Sampler Name: LTR Phone #: 865-4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
					4-29-98						
	RS#5	Soil	X		11:15	2	250 Amber	Please [redacted] Analyze	8020 TPH 8015		
								TO 5ppB IF	1		
								Possible. (8020)			

Relinquished by: Signature [signature]	Received by: Signature [signature]	Date/Time 5/1/98 10:00
Relinquished by: Signature [signature]	Received by: Signature [signature]	Date/Time 5-1-98 10:00

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										